

FENOC

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Beaver Valley Power Station, Unit No. 2
Docket No. 50-412 License No. NPF-73
LER 2003-003-00

United States Nuclear Regulatory Commission
Document Control Desk
Washington, DC 20555

In accordance with Appendix A, Beaver Valley Technical Specifications, the following
Licensee Event Report is submitted:

LER 2003-003-00, 10 CFR 50.73(a)(2)(iv)(A), "Automatic Reactor Trip Due to
Low Steam Generator Water Level."


L. William Pearce

Attachment

- c: Mr. T. G. Colburn, NRR Senior Project Manager
Mr. P. C. Cataldo, Sr. Resident Inspector
Mr. H. J. Miller, NRC Region I Administrator
INPO Records Center (via electronic image)
Mr. L. E. Ryan (BRP/DEP)

IE22

NRC FORM 366 (7-2001)		U.S. NUCLEAR REGULATORY COMMISSION		APPROVED BY OMB NO. 3150-0104 <small>Estimated burden per response to comply with this mandatory information collection request: 50 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the Records Management Branch (T-6 E6), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to bis1@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NE08-10202 (3150-0104), Office of Management and Budget, Washington, DC 20503. If a means used to impose information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.</small>		EXPIRES 7-31-2004		
LICENSEE EVENT REPORT (LER) <small>(See reverse for required number of digits/characters for each block)</small>								
1. FACILITY NAME Beaver Valley Power Station Unit No. 2				2. DOCKET NUMBER 05000412		3. PAGE 1 of 4		
4. TITLE Automatic Reactor Trip Due to Low Steam Generator Water Level								
5. EVENT DATE			6. LER NUMBER			7. REPORT DATE		
MO	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REV NO	MO	DAY	YEAR
10	14	2003	2003	003	00	12	11	2003
8. OPERATING MODE 1			11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR 5: (Check all that apply)					
10. POWER LEVEL 39 %			20.2201(b)		20.2203(a)(3)(i)		50.73(a)(2)(v)(B)	
			20.2201(d)		20.2203(a)(4)		50.73(a)(2)(ix)(A)	
			20.2203(a)(1)		50.36(c)(1)(i)(A)		X 50.73(a)(2)(iv)(A)	
			20.2203(a)(2)(i)		50.36(c)(1)(ii)(A)		73.71(a)(4)	
			20.2203(a)(2)(ii)		50.36(c)(2)		73.71(a)(5)	
			20.2203(a)(2)(iii)		50.48(a)(3)(B)		OTHER Specify in Abstract below or in NRC Form 366A	
			20.2203(a)(2)(iv)		50.73(a)(2)(i)(A)		50.73(a)(2)(v)(C)	
			20.2203(a)(2)(v)		50.73(a)(2)(i)(B)		50.73(a)(2)(v)(D)	
			20.2203(a)(2)(vi)		50.73(a)(2)(i)(C)		50.73(a)(2)(vii)(A)	
			20.2203(a)(3)(i)		50.73(a)(2)(ii)(A)		50.73(a)(2)(viii)(B)	
12. LICENSEE CONTACT FOR THIS LER								
NAME L. R. Freeland, Manager Regulatory Affairs/Performance Improvement						TELEPHONE NUMBER (Include Area Code) (724) 682-5284		
13. COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT								
CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPRI	CAUSE	SYSTEM	COMPONENT	
X	JB	LIC	W351	Yes				
14. SUPPLEMENTAL REPORT EXPECTED					15. EXPECTED SUBMISSION DATE			
YES (If yes, complete EXPECTED SUBMISSION DATE)					MONTH DAY YEAR			
X NO								
16. ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines)								
<p>On October 14, 2003, at 2355 hours, Beaver Valley Power Station Unit No. 2 reactor automatically tripped from 39 percent power and Auxiliary Feedwater was actuated due to low-low level in the "B" Steam Generator. Prior to the reactor trip, the control room operators were reducing power from 65 to 30 percent to support mechanical maintenance on the Heater Drain Pumps. The root cause was determined to be a failure of the Westinghouse 7300 multiplier/divider card, 2FWS-FX486, in the channel IV "B" loop feedwater flow channel. After the reactor trip, Emergency Operating Procedure E-0 for Reactor Trip was performed, the plant was stabilized in Mode 3 and safety systems functioned as designed. This event was reported under 10 CFR 50.72(b)(2)(iv)(B) and 50.72(b)(3)(iv)(A) as a Reactor Protection System (RPS) actuation reactor trip. This event is also reportable pursuant to 10 CFR 50.73(a)(2)(iv)(A) as a valid actuation of the RPS and Auxiliary Feedwater System that was not part of a pre-planned sequence. Based on the conditional core damage probability for the event when considering the actual component unavailability that was present at the time of the reactor trip, the safety significance of the automatic reactor trip was low.</p>								

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PLANT AND SYSTEM IDENTIFICATION

Westinghouse-Pressurized Water Reactor System
Feedwater/ Steam Generator Water Level Control System (JB)
Auxiliary / Emergency Feedwater System (BA)
HP Heater and MSR Drains and Vents System (SN)

CONDITIONS PRIOR TO OCCURRENCE

Unit 2: Mode 1 at 39 percent power

There were no other systems, structures, or components that were inoperable at the start of the event that contributed to the event other than as described below.

DESCRIPTION OF EVENT

On October 14, 2003, at 2355 hours, Beaver Valley Power Station Unit No. 2 reactor automatically tripped from 39 percent power and the Auxiliary Feedwater System was actuated, as designed, due to low-low level in the "B" Steam Generator. Prior to the reactor trip, the control room operators were reducing power from 65 to 30 percent to support mechanical maintenance on the Heater Drain Pumps. During this evolution there was a dedicated operator assigned to monitor and maintain Steam Generator water level. At this time, all three Main Feedwater Regulating Valves (MFRV) were in automatic and were controlling normally when the "B" Steam Generator level deviation alarm was received, indicating a deviation between actual level and program level in the "B" Steam Generator. The level deviation alarm resulted from the "B" MFRV moving in the closed direction, thus reducing the feedwater flow to the "B" steam generator. The MFRV closure transient was unable to be turned by the operators due to the short time to diagnose and respond to the event, as well as the unique nature of the failure. The Shift Manager realized that a reactor trip was going to occur but was unable to order a manual reactor trip prior to receiving an automatic reactor trip due to low-low Steam Generator level. After the reactor trip, Emergency Operating Procedure E-0 for Reactor Trip was performed, the plant was stabilized in Mode 3 and safety systems functioned as designed.

REPORTABILITY

The automatic initiation of a reactor trip from 39 percent power via the Reactor Protection System (RPS) on October 14, 2003, was a valid reactor trip and was not part of a pre-planned sequence during testing or reactor operation. This event was reported under 10 CFR 50.72(b)(2)(iv)(B) and 50.72(b)(3)(iv)(A) as a RPS actuation "reactor trip". The ENS notification occurred at 0156 on October 15, 2003, via ENS No. 40247. This event is also reportable pursuant to 10 CFR 50.73(a)(2)(iv)(A) as a valid actuation of the RPS and a valid actuation of the Auxiliary Feedwater System that was not part of a pre-planned sequence.

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CAUSE OF EVENT

The investigation that followed the reactor trip revealed the root cause was a failure of the Westinghouse 7300 multiplier/divider card, 2FWS-FX486, in the channel IV "B" loop feedwater flow channel. The function of this card is to develop a flow signal from the transmitter differential pressure signal. In turn the flow signal from this card is used to control the "B" MFRV. The output of the card was found to be oscillating which caused the control system to deviate from level setpoint. The card failed in a manner that caused channel IV of "B" loop feed flow to indicate approximately 600,000 lbs/hr higher than actual flow. This resulted in the feedwater control system commanding the "B" MFRV to travel in the closed direction, and the MFRV closing caused the "B" Steam Generator level to drop. Due to the unique nature of the card failure the operators were unable to diagnose and respond to the MFRV closure transient prior to reaching the steam generator low level trip setpoint. Further investigation into the nature of the card failure is continuing.

SAFETY IMPLICATIONS

Following the automatic reactor trip, the control rods fully inserted into the reactor core and the required safety systems operated as designed. Emergency Operating Procedure E-0 for reactor trip was performed and the plant was stabilized in Mode 3.

This event was a partial loss of main feedwater, which is less severe than the design basis event for complete loss of main feedwater. The complete loss of main feedwater is analyzed in BVPS Unit No. 2 UFSAR Section 15.2.7. Comparison of the UFSAR Loss of Feedwater Transient with the October 14, 2003, event indicates that BVPS Unit 2 operated conservatively regarding the UFSAR transient in all comparisons of UFSAR assumptions. The actual plant response on October 14, 2003 was bounded by the UFSAR analysis for a loss of main feedwater transient.

The plant risk associated with the BVPS Unit 2 reactor trip that occurred on October 14, 2003 due to a low "B" steam generator level is considered to be low. This is based on the conditional core damage probability for the event when considering the actual component unavailability that was present at the time of the reactor trip.

Based on the above, the safety significance of the automatic reactor trip on October 14, 2003, was low.

CORRECTIVE ACTIONS

1. The Main Feedwater Regulating Valve 7300-multiplier/divider card, 2FWS-FX486 was replaced on October 16, 2003.
2. Preventive Maintenance tasks to periodically replace other critical multiplier/divider cards have been established.

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3. Further investigation into the nature of the card failure is continuing.

4. This event has been reviewed with the Beaver Valley Power Station Unit No. 2 control room crews.

Corrective action completion is being tracked through the corrective action program.

PREVIOUS SIMILAR EVENTS

A review of past Beaver Valley Power Station Units 1 and 2 Licensee Event Reports found three similar events involving a reactor trip associated with steam generator water level within the last five years:

- BVPS Unit 1 LER 2001-003-00 "Automatic Reactor Trip Due to Low Steam Generator Water Level."
- BVPS Unit 2 LER 2001-001 "Automatic Reactor Trip Due to Loss of Condensate Pump"
- BVPS Unit 1 LER 1998-028, "Automatic Reactor Trip on 'A' Steam Generator Low Level Coincident with Steam Flow/Feed Flow Mismatch Signal from Manual Tripped Transmitter Bistables of F-MS-475."

ATTACHMENT

Beaver Valley Power Station, Unit No. 2 License Event Report 2003-003-00

Commitment List

The following list identifies those actions committed to by FirstEnergy Nuclear Operating Company (FENOC) for Beaver Valley Power Station (BVPS) Unit No. 2 in this document. Any other actions discussed in the submittal represent intended or planned actions by Beaver Valley. These other actions are described only as information and are not regulatory commitments. Please notify Mr. Larry R. Freeland, Manager, Regulatory Affairs/Performance Improvement, at Beaver Valley on (724) 682-5284 of any questions regarding this document or associated regulatory commitments.

Commitment

None

Due Date

N/A